Oakdale Expressway Project

Mitigation for Planned Stanislaus River Crossing at RM 49.8

Proposed Scope of Work
August 22, 2003

Proposed Mitigation by the California Department of Transportation in Partnership with the California Department of Fish and Game and California Department of Water Resources

Background

The Stanislaus River is the northernmost of the three major tributaries to the San Joaquin River. Its 1,100 square mile watershed produces approximately 21% of the average unimpaired runoff to the San Joaquin River basin (Stanislaus River Fish Group, 2003). The lower Stanislaus River stretches 58.3 miles from the confluence with the San Joaquin up to Goodwin Dam, the terminus for anadromous fish.

The New Melones reservoir was created with the completion of New Melones Dam at river mile 68 in 1979. The reservoir has a storage capacity of 2.4 million acre feet, and reduced the 2 year maximum daily mean flow below Goodwin Dam (RM 58.3, constructed in 1912) from about 4,300 cfs to 2,600 cfs. The maximum recorded flow below Goodwin Dam since 1979 is about 8,000 cfs. The effect of multiple dams and reduced flows has been a sediment starved Stanislaus River with an armored and immobile river bed. This condition has been recognized as a detriment for natural function of the river and an additional limiting factor for the life cycles of anadromous fish.

The California Department of Transportation plans to construct and operate the State Route 120 Oakdale Expressway Project to bypass the City of Oakdale (Caltrans 1998). The purpose of the project is to reduce traffic congestion, enhance continuity, and improve safety on the highway, particularly within the City of Oakdale. The alternative chosen for implementation is approximately 10 miles long, and crosses the Stanislaus River north of the Honolulu Bar Public Access Area near River Mile 49.8, about eight river miles downstream of Goodwin Dam. Preliminary plans found in the 1998 Caltrans technical report show that the bridge planned to span the river at that site will be a five-span bridge approximately 700 feet long with about 40 feet of clearance from the channel thalweg to the bottom chord. Preliminary construction activity for the bridge is scheduled for summer of 2005, with scheduled completion in 2006.

Project Description

There is some concern that, during installation and removal of temporary pilings needed for construction of falsework and forms as part of the bridge construction process, disturbance of the river channel could result in fine sediment being carried downstream. Effectiveness of downstream spawning riffles may be compromised if too much fine sediment is deposited in the gravels during bridge construction (Figure 1). Possible negative effects on the river and the spawning riffles prompted Caltrans to contract with the Department of Fish and Game (DFG) and the Department of Water Resources (DWR) to provide monitoring and mitigation assistance. DWR will monitor the quality of the gravel downstream and the amount of fine material deposited. Mitigation could include cleaning the gravel in place or adding clean gravel to the riffle after bridge construction activity ceases to disturb fines in the channel.

In addition, Caltrans has agreed to further mitigate impacts to the river by funding a project that is intended to increase the proportion of flow in the right-bank channel just downstream of the bridge site (Figure 1). DFG has recognized that over time the smaller right-bank channel has diminished in capacity at low river flows. They believe that there is valuable spawning and/or rearing habitat in that channel and would like to maintain flow through it.

This scope of work describes activities proposed both to monitor impacts to the riffle improvement project by bridge construction and to enhance the current conditions immediately downstream of the bridge site. Proposed activities will include hydraulic and sediment transport modeling of the site, design and implementation of a monitoring plan for the bridge construction, and design and construction of a gravel structure to increase flow down the right-bank channel beginning about 400 feet downstream of the planned bridge. This work is planned to be done in three phases: baseline data collection, design, and construction and monitoring. A description of work proposed in each of these phases follows. DWR will be responsible for data collection, design, oversight of mitigation construction, and monitoring. DFG will be responsible for construction of the project, and Caltrans will be responsible for obtaining all required permits for the project. See Figure 2 for a complete time schedule and Figure 3 for a cost estimate of the project.

Phase 1: Baseline Data Collection

The previous gravel addition project mentioned above is an important component of this project. DWR will be charged with assessing whether or not sediment is deposited on the riffle during bridge construction activities. This will include topographic and cross sectional surveys, as well as gathering bulk samples and/or pebble counts of the existing gravel material to be used as a baseline and for sediment transport calculations. These surveys, as well as the ones detailed below, are scheduled to take about one week (Figure 2).

Topographic and/or cross sectional surveys will also be necessary for the right and left bank channels throughout the split flow portion of the river (about 2,250 feet) so that we can determine the existing hydraulic controls in the channel. Those controls establish how much water will flow down each channel at a given river flow, and so will be an important factor in developing a design to increase flow in the diminished right-bank channel.

Finally, cross-sectional surveys will be necessary at several points both upstream and downstream of the bridge site and riffle so that a HEC-RAS hydraulic model and a sediment model may be created for the reach. Several cross sections will be surveyed within 1000 feet upstream of the bridge site, and surveys in the split-channel reach will be augmented to create several sections across the island. We anticipate a need for 8 to 10 sections within a 3,000 foot reach in all for the hydraulic model (Figure 1). Anticipated cost for the baseline data collection described is $20,710 (Figure 3).

Phase 2: Design

The design process for both the monitoring program and the right-bank channel flow improvement will begin with hydraulic and sediment model creation. For the hydraulic model, we will use the surveyed cross sections and water surface elevations to construct an HEC-RAS water surface profile computation model. The model will allow designers to determine water elevations and other characteristics that will guide the channel flow improvement design. Calibration at high flows will involve comparison to the Caltrans HEC-2 model, while low flows will be calibrated by comparing to surveyed low-flow water elevations. Creation of this model is scheduled to take one week.

The sediment mobility model will use data gathered on cross sections near and within the affected riffle reach. Data used will include velocity profile data, cross sectional profiles, and bulk sample results. We will use this data in sediment transport calculations to determine mobility of existing material. We will also use the model to help determine the necessary size, within the suggested size ranges for Chinook salmon and Steelhead trout, of the additional gravel to be added. Creation of this model is scheduled to take three days.

We will begin preliminary design of the right-bank channel flow improvement project after the topographic, sediment transport, and hydraulics models are complete. Their results will help determine size of gravels to use and where to place them, as well as how much will be needed. Preliminary estimates suggest that it will require up to 2,000 yd^3. Coinciding with that effort, a preliminary riffle monitoring plan will be developed for implementation during bridge construction activities. This preliminary design phase is expected to take three weeks, and will include production of a preliminary report, including preliminary cost estimates, for review by agencies.

A review period will follow production of the preliminary designs. Review by Caltrans, DWR, DFG, Stanislaus River TAC, and others will be scheduled to last three weeks, at which time a meeting will be held to discuss the plan.

Final design for channel flow improvement and monitoring will be scheduled to be completed three weeks after the review meeting. At that time, deliverables will include a report detailing a maintenance scheme in addition to plans and final cost estimates of mitigation construction and monitoring. The final design report will also be used in obtaining the necessary permits for construction of the mitigation project. The total cost for this phase is estimated to be $25,052 (Figure 3).

Phase 3: Construction, Monitoring, and Mitigation

Caltrans plans to install the temporary bridge piers between June 15th and September 15th, 2005. Under Caltrans oversight, DWR will carry out the riffle impact monitoring program as in-channel work progresses and according to the designed monitoring plan. DFG construction of the right-bank channel flow improvement project will begin that September immediately following the pier work, and should be completed within two weeks. If detrimental effects by the bridge construction have been identified, possible remedies could also take place during this period, and may include cleaning gravel by ripping the riffle or addition of new gravel to the riffle. DWR monitoring for the channel improvement project will involve two days of cross sectional and topographic surveys, as well as at least two sessions of pebble counts and bulk samples. The mitigation construction and monitoring will be completed by early October, 2005. Although Caltrans is ultimately responsible for mitigation of the bridge project, monitoring reports submitted by DWR in the form of memoranda will include all collected data and analysis of the data as well as recommendations. Preliminary estimates for the cost of material for the project equal about $70,000. Construction oversight and monitoring are expected to cost $24,815 and $28,486 respectively (Figure 3).

References

Stanislaus River Fish Group, May 2003. Draft - A Plan to Restore Anadromous Fish Habitat to the Lower Stanislaus River

California Department of Transportation (Caltrans), November 1998. Location Hydraulic and Floodplain Report – State Route 120 Oakdale Expressway Project.

1993 Aerial - Oakdale Expressway Project Mitigation Proposal	07/23/03 CDWR SJD RMS
	Figure 1

Oakdale Expressway Project Proposed Mitigation and Monitoring Schedule

ID	Task Name	Duration	Start	Finish
1	**Baseline Data Collection**	**5 days**	**Mon 9/1/03**	**Fri 9/5/03**
2	Survey of North Channel	3 days	Mon 9/1/03	Wed 9/3/03
3	Survey of South Channel	3 days	Mon 9/1/03	Wed 9/3/03
4	Sediment Data collection (pebble counts, grab samp	1 day	Thu 9/4/03	Thu 9/4/03
5	Compile Existing Information	1 day	Fri 9/5/03	Fri 9/5/03
6	**Design**	**174 days**	**Mon 9/1/03**	**Thu 4/29/04**
7	Hydraulic Modeling	6 days	Mon 9/8/03	Mon 9/15/03
8	Sediment Transport Calculations	2 days	Tue 9/16/03	Wed 9/17/03
9	Development of Preliminary Plan	15 days	Tue 9/16/03	Mon 10/6/03
10	Meeting to discuss Plan	1 day	Tue 10/7/03	Tue 10/7/03
11	Review of Preliminary Plan	15 days	Wed 10/8/03	Tue 10/28/03
12	Final Plan	10 days	Mon 9/1/03	Fri 9/12/03
13	Permits	120 days	Fri 11/14/03	Thu 4/29/04
14	**Bridge Construction**	**354 days?**	**Wed 6/1/05**	**Mon 10/9/06**
15	Install Temporary Bridge Piers	88 days	Wed 6/1/05	Fri 9/30/05
16	Remove Temporary Bridge Piers	87 days?	Thu 6/1/06	Fri 9/29/06
17	Monitor Sedimentation (gravel augmentation site)	5 days	Wed 6/1/05	Mon 10/2/06
18	Sieve Analysis	5 days	Wed 6/1/05	Mon 10/9/06
19	Mitigation Project Construction	10 days	Mon 9/20/04	Fri 10/1/04
20	**Mitigation Project Monitoring**	**527 days**	**Wed 6/1/05**	**Thu 6/7/07**
21	**Mitigation Project Monitoring 1**	**4 days**	**Wed 6/1/05**	**Mon 6/6/05**
22	Surveys	2 days	Wed 6/1/05	Thu 6/2/05
23	Pebble Counts, Bulk Samples	2 days	Wed 6/1/05	Thu 6/2/05
24	Monitoring Report (memo)	2 days	Fri 6/3/05	Mon 6/6/05
25	**Mitigation Project Monitoring 2**	**4 days**	**Thu 6/1/06**	**Tue 6/6/06**
26	Surveys	2 days	Thu 6/1/06	Fri 6/2/06
27	Pebble Counts, Bulk Samples	2 days	Thu 6/1/06	Fri 6/2/06
28	Monitoring Report (memo)	2 days	Mon 6/5/06	Tue 6/6/06
29	**Mitigation Project Monitoring 3**	**4 days**	**Mon 6/4/07**	**Thu 6/7/07**
30	Surveys	2 days	Mon 6/4/07	Tue 6/5/07
31	Pebble Counts, Bulk Samples	2 days	Mon 6/4/07	Tue 6/5/07
32	Monitoring Report (memo)	2 days	Wed 6/6/07	Thu 6/7/07

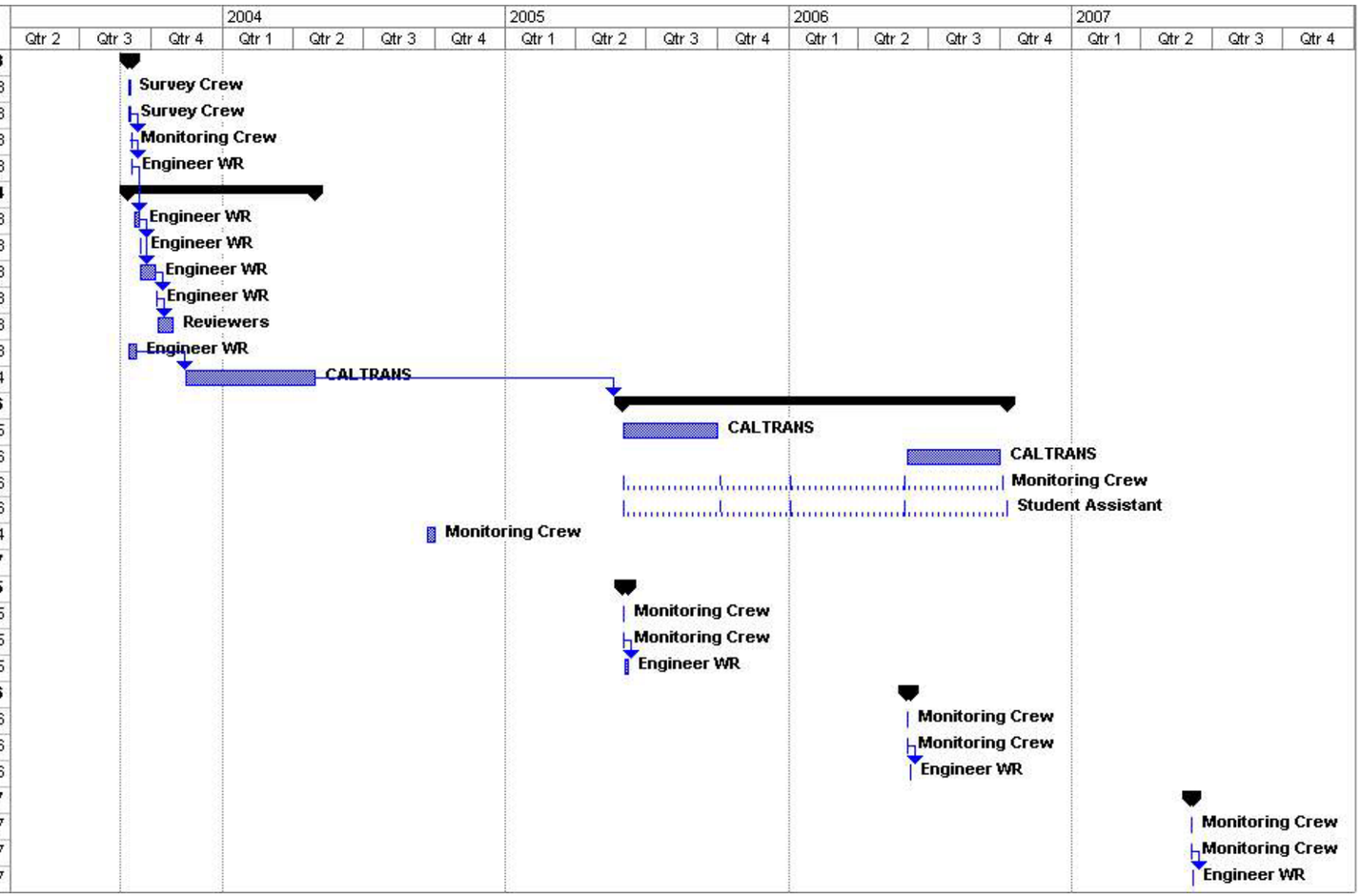

Figure 2

Oakdale Expressway Project Mitigation Proposal
Preliminary Cost Estimate

ID	Task Name	Cost	Total Cost
1	**Baseline Data Collection**		
2	Survey of North Channel	$8,682.24	
3	Survey of South Channel	$8,682.24	
4	Sediment Data collection (pebble counts, grab samples)	$2,532.04	
5	Compile Existing Information	$813.96	$20,710.48
6	**Design**		
7	Hydraulic Modeling	$4,431.56	
8	Sediment Transport Calculations	$1,537.48	
9	Development of Preliminary Plan	$10,943.24	
10	Meeting to discuss Plan	$813.96	
11	Review of Preliminary Plan	$0.00	
12	Final Plan	$7,325.64	
13	Permits	$0.00	$25,051.88
14	**Bridge Construction**		
15	Install Temporary Bridge Piers	$0.00	
16	Remove Temporary Bridge Piers	$0.00	
17	Monitor Sedimentation (gravel augmentation site)	$8,320.20	
18	Sieve Analysis	$939.20	
19	Mitigation Project Construction	$15,555.40	$24,814.80
20	**Mitigation Project Monitoring**		
21	Mitigation Project Monitoring 1		
22	Surveys	$3,979.08	
23	Pebble Counts, Bulk Samples	$3,979.08	
24	Monitoring Report (memo)	$1,537.48	
25	Mitigation Project Monitoring 2		
26	Surveys	$3,979.08	
27	Pebble Counts, Bulk Samples	$3,979.08	
28	Monitoring Report (memo)	$1,537.48	
29	Mitigation Project Monitoring 3		
30	Surveys	$3,979.08	
31	Pebble Counts, Bulk Samples	$3,979.08	
32	Monitoring Report (memo)	$1,537.48	$28,486.92
			$99,064.08

Figure 3